

AUDIO VISUAL SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Specification sections, apply to work of this section.

1.2 ADMINISTRATIVE REQUIREMENTS:

- A. Bid Submittal:
 - 1. Equipment Costs: Breakout cost of material and labor as different line items.
 - 2. Provide itemized list of equipment with bid submittal.
 - 3. Provide a price for the following options:
 - a. The base bid, drawings and specifications.
 - b. Breakout the different furniture boxes as separate line items. Mark as alternates.
- B. Coordination:
 - 1. Coordinate final inspection of the systems installed, with engineer, three (3) weeks in advance.
 - 2. Coordinate with school for installation times available.

1.3 DESCRIPTION OF WORK:

- A. Provide the specified systems in a complete and operating condition with all necessary materials and labor to fulfill the requirements and the intent of the specifications. Consisting of amplifiers, loudspeakers, converters, microphones, and other components as required for a complete installation. Except as otherwise indicated, provide manufacturer's standard system components; construct and design in accordance with published product information.
- B. Provide all equipment as specified unless written approval for substitutions is obtained from the engineer. Catalog sheets of all proposed equipment shall be provided with the proposal. Contractor shall furnish all cables, materials and equipment, whether specifically mentioned herein or not, to insure a complete and functional systems
- C. All electronic equipment shall be new and of current model.
- D. Cables shall be marked with commercial wire markers and shall be designated with the architectural room number or description of the area served by that device. Also label the input and output
- E. Provide system testing as described herein.
- F. Contractor shall attend mandatory pre-bid walk through to bid on this project.

1.4 QUALITY ASSURANCE:

- A. Manufacturers:
 - 1. Firms regularly engaged in manufacture of audio visual systems, components, and accessories, of types, capacities and characteristics required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer:
 - 1. Must have CTS-I (Certified Technology Specialist Installation) employed, full time, to oversee bid and installation procedures.

2. Contractor shall have worked satisfactorily for a minimum of (5) years of completing systems equal to this scope, quality, type and complexity.
 3. Key personal assigned to the project shall each have minimum of (10) years of experience in completing systems equal to this scope, quality, type and complexity.
 4. The contractor shall be the factory authorized distributor for the geographical area and shall maintain complete installation and service facilities during the construction of this project.
 5. Shall have current manufacture certificates for each equipment and/or system listed within this specifications.
- C. Contractor must follow the standards described with-in:
1. BICSI/INFOCOMM AV Design Reference manual.
 2. ANSI/INFOCOMM 2M-2010 Standard guide for Audiovisual Systems Design and Coordination Processes.
- D. All work shall be done by expert technicians qualified in the field with knowledge of systems and detailed requirements for fine-tuned performance. Workmanship shall comply with standard professional broadcast practice concerning grounding, shielding, cable dressing, cable termination and equipment mounting. All mounting holes shall be utilized for any equipment.
- E. APPROVED INSTALLERS:
1. Cache Valley Elec.
 2. Marshall Industries.
 3. Performance Audio
 4. Poll Sound.
 5. PST.
 6. Bids submitted by non-approved installers shall not be accepted. To submit to become an approved installer, submit in writing a list of qualifications, past and current projects and (3) different referrals from the owners of (3) different projects, (10) working days prior to bid.

1.5 SUBMITTALS:

- A. All submittals shall be submitted in a digital format with bookmarks for each section of equipment. Any submittals that are partial or incomplete shall be rejected and count as one of the submittals allowance.
- B. Provide a complete bill of materials for all components, accessories and hardware to be provided in order to assemble a complete and working system as described within the contract documents. Provide an itemized list of all equipment to be supplied.
- C. Submit manufacturer's data and installation details for all devices, plates, cables and similar equipment. Product data showing multiple options, products and/or models shall be clearly marked identifying the specific options, products and/or models being provided.

1.6 WARRANTY:

- A. Systems shall be guaranteed for a period of one (1) year from the date of substantial completion against defective materials, inferior workmanship or improper installation adjustment. Guarantee shall cover all parts and labor.
- B. If system failure causes audiovisual system to be inoperative or unusable for its intended purpose, contractor, when notified of the problem shall repair system so it will be operational and usable within three (3) business days. If defective components cannot be repaired in time, provide temporary equipment as required.
- C. Contractor shall honor component warranties for term established by manufacturer, if greater than warranty time frame mentioned above.

PART 2 – PRODUCTS

2.1 GENERAL:

- A. All equipment shall be installed as shown on the drawings and in strict accordance with the specifications. Any errors, conflicts, or omissions discovered in the specifications or the drawings shall be submitted in writing to the engineer for clarification. Construction shall not proceed until questions have been resolved.
- B. All electronic equipment shall be new and of current model.
- C. Should model numbers used in this specification be retired, provide the manufacturer's updated model type and note in submittal the discrepancy.
- D. No amplifier shall be connected to a normal load that exceeds 60% of the continuous rated output. Amplifiers shall power down when the connected zones are not being used, or not going to be used. Provide a power Sequencer for powering down any AV equipment, follow proper powering down procedures for all equipment requiring power.
- E. All limiters and/or compressors shall be set to prevent operators from over and/or under-adjusting sound levels.
- F. System shall be capable of reproducing voice, and audio from inputs to loudspeakers, as required. Provide appropriate cables for a complete and working system.
- G. System shall have no audible hum, noise, RFI pick up or distortion, when operating under normal conditions. System shall reproduce material at a level of (80 to 85) dBA without audible distortion. All input levels shall be pre-set so system may be operated without going into feedback under normal conditions.
- H. Refer to riser diagrams and plans for device and equipment locations.
- I. Basis of Design. Provide equipment as specified in section 2.2 for the various audio-visual systems. Pre-approved manufacturers of audio-visual equipment are as follows:
 - 1. Pre-approved manufacturers of video and/or audio capture, playback, display equipment, distribution equipment, provided they are equal to specified equipment, are: AMX, Atlas Sound, Biamp, BSS, Crestron, Denon, Epson, Extron, Lectrosonics, LG, Panasonic, RDL, Sennheiser, Sharp, Shure, Sony, SoundTube, and Tascam.
 - 2. Equipment submitted in Bid proposal that have not been approved by Engineer in writing shall not be accepted and shall be replaced by approved equipment at contractor's expense. Equipment not listed within this specification, or contract documents that is required for a complete and workings system, shall be of professional grade and used in the same manner as needed for a complete and working system.
 - 3. All proposed substitutions for equipment specified shall be submitted to engineer, 10 working days prior to bid, proving that it is of equal or better than the specified equipment including, but not limited to: sound mapping, bit rates, sampling, bandwidth, resolution etc. Engineer has the final say if it is of equal or great value over the specified equipment, and may require demonstration of proposed equipment verses specified equipment at the contractor's expense.
- J. Master quotes do not relieve contractor from performing their due diligence for equipment type, quantity, and quantity of room types. Any errors, conflicts, or omissions between the drawings and/or specifications and master quotes shall be the responsibility of the contractor to resolve. Master quotes may not have all the equipment to provide a complete and working system, contract shall be responsible to verify that everything is in their bid for a complete and working system prior to submitting their bid.

2.2 EQUIPMENT SCHEDULE

- A. WEATHER-PROTECTING DEVICE ENCLOSURES:

1. Where required for compliance with NEC 406-8 (receptacles installed outdoors for use other than with portable tools or equipment), provide weather-tight device covers that provide complete protection with the cord and cap inserted into the wiring device. Provide units that mount on either single or double gang devices.
2. Provide products of one of the following manufacturers:
 - a. Intermatic WP1020 or WP1030
 - b. P&S WIUC10C or WIUC20c

B. FOOTBALL FIELD:

SYM.	DESCRIPTION	QTY.	MODEL NO.
	CABLE, SPEAKER 12 AWG	A/R	WEST PENN 227 BELDEN 8477
S-52	LOUDSPEAKER, LONG-THROW 50 DEGREE X 20 DEGREE	3	COMMUNITY R2-52Z
S-SW	LOUDSPEAKER, SUBWOOFER GROUND MOUNT	1	COMMUNITY R2SUBDF
	DIGITAL SIGNAL PROCESSOR 12 INPUTS X 8 OUTPUTS CONTROLLER	1	BSS BLU-100 BLU-8
	POWER AMPLIFIER 4 CHANNELS X 1250 WATTS	1	CROWN DCi 4 1250
	TABLE CUBBY OPTION 1 (2) XLR 3-PIN (2) RJ-45 (1) ACTIVE AUDIO W/2 INPUTS (1) AAP BRACKET KIT	1	EXTRON CABLE CUBBY 500 70-103-14 70-491-12 70-110-13 70-1039-01
	TABLE CUBBY OPTION 2 (2) XLR 3-PIN (2) RJ-45 (1) ACTIVE AUDIO W/2 INPUTS	1	EXTRON HSA 400 70-110-13 70-103-14

C.

2.3 CABLING

- A. Cable as specified is manufactured by Gepco wire equals of West Penn, and Belden are acceptable. Cables are to be labeled within 6" from both ends with the source and destination clearly legible.
- B. Cables shall be grouped according to their signal type, grouped cables shall be Velcroed together, and NO zip ties shall be used.
- C. Cables shall not receive excessive force when being installed.
- D. Cables that have been damaged during installation shall be replaced at contractor's expense. Contractor shall verify that all connections are in proper working order, terminated correctly and provide documentation to engineer prior to final walk through.
- E. Cables listed below may or may not be plenum rated, it shall be the responsibility of the contractor to determine if plenum rated cable is required. The AHJ shall have the final say if plenum cable is required, and replacement of cabling shall be at no cost to the owner.
- F. Loudspeaker: Gepco – SSUB122
 1. 12/2 bare copper, premium grade S-R PVC.

PART 3 – EXECUTION

3.1 INSTALLATION OF AUDIO/VISUAL SYSTEMS:

- A. Install Audio-Visual systems and ancillary equipment as indicated on drawings and in accordance with equipment manufacturer's written instructions, and the NEC, and with

recognized industry practices, to insure that the system fulfill requirements.

- B. Use extreme care in handling, fishing and pulling of electronic cable to avoid damage to cable. Avoid excessive number of bends. Contractor is responsible for replacing cable that has been mishandled or suffers from poor performance due to installation. Cables shall not be spliced, specified junction boxes, conduit, cabling, pull strings, speaker enclosures and equipment cabinets are properly installed and labeled with labeling requirements previously mentioned.
- C. Contractor shall ensure that no solid or decorative structure shall impede audio broadcast from speakers and that no structure greater than 3/4 inch is permanently placed in front of the speakers.
- D. Firmly secure all equipment in place that is not intended for portability.
- E. Mount permanently and/or provide mechanical index insuring precise alignment of the projected image of optical projectors.
- F. Provide adequate structural support for components. Provide fastenings and supports with a safety load factor of at least five.

3.2 FIELD QUALITY CONTROL:

A. TESTING:

- 1. Upon completion of installation of each system and after electrical circuitry has been energized, demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units on site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with testing.
- 2. Before inspection by owner and engineer, and after completion of the installation, conduct system tests and make necessary corrections for proper system operation including, but not limited:
 - a. Test for compliance with the functional requirements and performance standards.
 - b. Adjust, balance and align equipment for optimum quality and to meet the manufacturer's published specifications.
 - c. Prepare and maintain documentation of performance tests, including numerical values of established equipment settings, for reference during the system acceptance tests. Submit final results to owner and Engineer.
 - d. Prepare and maintain documentation of performance tests, including numerical values of established equipment settings, for reference during the System Acceptance Tests. Submit final results to owner and Engineer.
 - e. Test signal: Establish a nominal test signal level to be input to the speech and program sound systems. Record preliminary signal level.
 - f. Loudspeaker-Line Impedance: Measure at 250 Hz, 1 kHz, and 4 kHz the impedance and resistance of each loudspeaker line leaving the sound equipment rack with the line disconnected from its normal driving source.
 - g. Measure the hum and noise levels of the overall system for each microphone input channel and line-level input channel.
 - h. Adjust gain controls for optimum signal-to-noise with 0 dBu at a line-level input.
 - i. Provide uniformity coverage of ± 2 dBa, measure octave band of pink noise test signal, at 1, 2, and 4 kHz, played through loudspeaker system.
 - j. Perform polarity checks of loudspeaker lines by means of a polarity tester or use DC source at one end of each line and a voltmeter at the other end. Loudspeaker lines shall be identically polarized with respect to color coding.

- k. Loose parts and poor workmanship or soldering shall be replaced.
- l. Sweep speaker systems with high-level sine wave or 1/3 octave pink noise source. Correct causes of buzzes or rattles related to speakers or enclosures. Notify owner of external causes of buzzes or rattles.
- 3. Rough Balance: Balance system well enough that it can be tested before final inspection.

B. RECORD DRAWINGS:

- 1. Provide a complete set of "as built" drawings showing wiring, specific interconnections between all equipment and internal wiring of equipment

3.3 OPERATING AND MAINTENANCE MANUALS:

- A. Operating and maintenance manuals shall be submitted prior to testing of system. Total of (2) manuals, shall be delivered to the Company. Manuals shall include all model numbers, service, installation, and programming information.

3.4 TRAINING:

- A. Provide two (2) sessions of one (1) hour each of training on the operation of each system, at job site, at no cost to owner.
- B. Training shall be video recorded, and (2) copies shall be given to the owner.
- C. The second training shall take place within a month of the first training and all questions shall be answered.

END OF SECTION 27 4100